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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/586,386

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Gunther Leising

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FITZPATRICK CELLA HARPER & SCINTO

1290 Avenue of the Americas

NEW YORK, NY 10104-3800

EXAMINER

LI, MEIYA

ART UNIT

PAPER NUMBER

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/586,386	Applicant(s) LEISING, GUNTHER	
	Examiner MEIYA LI	Art Unit 2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 23 March 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 9-15 is/are pending in the application.
- 4a) Of the above claim(s) 11 and 14 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 9,10,12,13 and 15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 3/17/08 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Applicant's request for reconsideration of the rejection of the last Office action is persuasive and, therefore, the rejection of that action is withdrawn.

Drawings

1. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the "light emitting diode die is mounted face down on the light emitting diode printed circuit board", claim 12; and the "rear side contacts of the light emitting diode", claim 13, must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 13 and 15 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

4. Claim 13 recites the limitation "the rear side contacts of the light emitting diode" in line 12. There is insufficient antecedent basis for this limitation in the claim.

5. Claim 15 recites the limitation "the plurality of through-contacts of the diode" in line 3. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 9, 12 and 13, as best understood, are rejected under 35 U.S.C. 102(b) as being anticipated by Suehiro et al. (2002/0139990).

As for claim, Suehiro et al. show in Fig. 2A and related text a light emitting diode 11, comprising:

at least one light emitting diode die 2, arranged on a light emitting diode printed circuit board 3/4 by means of a die attach 7a/7b, the light emitting diode printed circuit board comprising at a lower surface thereof rear side contacts 4 (bottom portion), and

wherein the rear side contacts at least partially overlap with contours of the light emitting diode die and are formed in such a way as to overlay with at least half of the lower surface of the printed circuit board, and wherein the printed circuit board comprises a plurality of through-contacts 4 (center portion) thermally and electrical connecting the rear side contacts to contact areas 4 (upper portion) formed on an upper surface of the printed circuit board.

As for claim 12, Bhat et al. show the light emitting diode die is mounted face down to the light emitting diode printed circuit board (Fig. 2; [0083], lines 3-4).

As for claim 13, Bhat et al. show in Fig. 9 and related text a light emitting diode 110, comprising:

at least one light emitting diode 112, wherein each said diode comprises at least one light emitting diode die, arranged on a light emitting diode printed circuit board 107 by means of a die attach 117, the light emitting diode printed circuit board comprising at a lower surface thereof rear side contacts (bottom portion or black-silk printing layer), wherein the rear side contacts at least partially overlap with contours of the light emitting diode die and are formed in such a way as to overlay with at least half of the lower surface of the printed circuit board, and wherein the printed circuit board comprises a plurality of through-contacts (center portion of black-silk printing layer on sidewalls of

107) thermally and electrical connecting the rear side contacts to contact areas (upper portion of black-silk printing layer) formed on an upper surface 107a of the printed circuit board, said diode being arranged on an additional board 111,

wherein the additional board comprises on an upper surface thereof further contact areas 113 (upper portion) which are soldered to the rear side contacts of the light emitting diode,

wherein a total surface area of the further contact areas is at least half of the area of the lower surface of the light emitting diode printed circuit board, and

wherein the additional board comprises a further plurality of through-contacts 113 (center portion of printing on sidewalls of 111) thermally and electrically connecting at least one of the further contact areas to a solder area (area above right side of solder 117) formed at a lower surface of the additional board.

Claim Rejections - 35 USC § 103

8. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

9. Claims 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suehiro et al. (2002/0139990) in view of Roberts et al. (2002/0149312).

As for claim 10, Suehiro et al. disclosed substantially the entire claimed invention, as applied to claim 1 above, except the light emitting diode printed circuit board is a metal core printed circuit board, and wherein the light emitting diode die is located on the metal core.

Roberts et al. teach in Fig. 4 and related text the light emitting diode printed circuit board 32 is a metal core printed circuit board ([0075], lines 1-3, and wherein the light emitting diode die 12 is located on the metal core.

It would have been obvious to one of ordinary skill in the art, at the time the invention was made to use metal core printed circuit board, as taught by Roberts et al., in Suehiro et al.'s device, in order to optimum thermal dissipation from the package.

As for claim 12, the combined device shows the light emitting diode die is mounted face down to the light emitting diode printed circuit board (Suehiro: Fig. 2; [0083], lines 3-4).

10. Claims 10 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Suehiro et al. (2002/0139990).

As for claim 15, Suehiro et al. disclosed substantially the entire claimed invention, as applied to claim 13 above, except at least one of the plurality of through-contacts of the diode and at least one of the further plurality of through-contacts of the additional board have a diameter of less than 100 μm .

It would have been obvious to one having ordinary skill in the art at the time of the invention was made to at least one of the plurality of through-contacts of the diode and at least one of the further plurality of through-contacts of the additional board having a diameter of less than 100 μm , in order to optimize the performance of the device. Furthermore, it has been held that discovering an optimum value of a result

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effective variable involves only routine skill in the art. *In re Boesch*, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

It has been held in that the applicant must show that a particular range is critical, generally by showing that the claimed range achieves unexpected results relative to the prior art range. *In re Woodruff*, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990). Note that the law is replete with cases in which when the mere difference between the claimed invention and the prior art is some dimensional limitation or other variable within the claims, patentability cannot be found. The instant disclosure does not set forth evidence ascribing unexpected results due to the claimed dimensions. See *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338 (Fed. Cir. 1984), which held that the dimensional limitations failed to point out a feature which performed and operated any differently from the prior art.

Response to Arguments

11. Applicant's arguments filed on March 23, 2011 have been fully considered but they are not persuasive.

Applicant argues that "figures 1 to 3 show both claimed features of the light emitting diode die (3) is mounted face down to the light emitting diode printed circuit board (6) and rear side contacts (7) of the light emitting diode. Accordingly, Applicant believes that the objection has been obviated and again requests that the objection be withdrawn."

Both figures 1 and 3 do not show claimed features of the light emitting diode die is mounted face down to the light emitting diode printed circuit

board and rear side contacts of the light emitting diode, instead the light emitting diode die is mounted face up to the light emitting diode printed circuit board and rear side contacts of the light emitting diode. The specification, paragraph [021], lines 3-4, also discloses that the light emitting diode is mounted face up. Furthermore, it is well known in the art that when the light emitting diode mounted face down to the printer circuit board, solder balls are directly connected both the light emitting diode and the printer circuit board.

Applicant argues that "Claims 12 and 15 comply fully with the requirements of 35 U.S.C §112, second paragraph, and request that the rejections of Claims 12 and 15 be withdrawn" because "line 4 of claim 13, which is believed to provide antecedent basis for "the rear side contacts of the light emitting diode," and "line 7 and 8 of claim 13, on which claim 15 depends, which is believed to provide antecedent basis for "the plurality of through-contacts of the diode."

"The rear side contacts", as recited in line 4 of claim 13, is the rear side contacts of the light emitting diode printed circuit board, and is not the rear side contacts of the light emitting diode.

"The plurality of through-contacts", as recited in lines 7-8 of claim 13, is the plurality of through-contacts of the printed circuit board, and is not the plurality of through-contacts of the diode.

Therefore, there are no antecedent bases for the recitations "the rear side contacts of the light emitting diode" and "the plurality of through-contacts of the diode".

Claims 12 and 15 are not comply fully with the requirements of 35 U.S.C §112, second paragraph.

Applicant argues that "Suehiro cannot disclose rear side contacts at least partially overlap with contours of the light emitting diode die and are formed in such a way as to overlap with at least half of the lower surface of the printed circuit board as provided for in Claim 9" because "proportional of features in a drawing are not evidence of actual proportions when drawings are not to scale" and "the Office Action does not provide any explanation of how or why the figures of Suehiro should be interpreted as being drawn to scale to show that the rear side contacts at least partially overlap with contours of the light emitting diode die and are formed in such a way as to overlap with at least half of the lower surface of the printed circuit board".

It is noted that "at least partially overlap" and "at least half" are not particular sizes, and the figure of Suehiro would reasonably teach one of ordinary skill in the art that the rear side contacts at least partially overlap with contours of the light emitting diode die and are formed in such a way as to overlap with at least half of the lower surface of the printed circuit board.

Applicant argues that Suehiro is not seen to disclose "a plurality of through-contacts thermally and electrically connecting the rear side contacts to contact areas formed on an upper surface of the printed circuit board" as recited in Claim 9, since the center portion within the through-hole 5 to which the Office Action refers appears to connect only one rear surface electrode", and "through-contacts respectively 'VIAs'

('Vertical Interconnect Access') refer to a vertical electrical connection between different layers of conductors in a printed circuit board which consists of two pads, in corresponding positions on different layers of the board, that are electrically connected by means of a hole through the board."

"Through-contacts" are not only refers to a vertical electrical connection between different layers of conductors in a printed circuit board which consists of two pads, in corresponding positions on different layers of the board, that are electrically connected by means of a hole through the board, but also can be defined as the contacts extending from one side of the substrate to another side of the substrate.

Therefore, Suehiro discloses "a plurality of through-contacts thermally and electrically connecting the rear side contacts to contact areas formed on an upper surface of the printed circuit board" as recited in claim 9.

Conclusion

12. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MEIYA LI whose telephone number is (571)270-1572. The examiner can normally be reached on Monday-Friday 8:00AM-4:30PM Eastern Standard Time.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Lynne Gurley can be reached on (571) 272-1670. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lynne A. Gurley/
Supervisory Patent Examiner, Art
Unit 2811

/M. L./
Examiner, Art Unit 2811
4/9/2011

